Fusion3

F200 3D Printer

TROUBLESHOOTING:
FEED ISSUES & FILAMENT JAMS

Revision 3/25/2026

FEED ISSUES, JAMS, & HOW TO TROUBLESHOOT THEM

How to diagnose and fix filament feed issues on F200

INTRODUCTION

What is a Filament Feed problem?

Filament feed problems, or filament feed issues, are what we call situations where the flow of molten plastic out of the print head completely stops, or comes out at a rate lower than intended.

What Causes a Filament Feed Problem?

A lot of things can happen to cause this:

- Jam in the print head
- The extruder has lost grip on the filament and has chewed it up
- The filament becomes wrapped/tangled on the spool and the extruder isn't able to pull it off the spool
- The filament becomes stuck in the bowden tube or in the extruder due to a bulge or thick section (rare)
- The filament has softened in the feed section from too many retractions in a row, and pressure from the feed gear has flattened it so that it no longer fits through the feed path (rare on F200)
- False-positive (filament monitor thinks there's a problem but there isn't)
- Filament has run out

Each of these cases can have multiple root causes. For example, a print head jam can be caused by any of these:

- Printing temperature too high resulting in pyrolysis of the material in the head
- Debris in the filament clogs the nozzle
- Cold side fan stops running and molten filament backs up into the cold side of the print head

F200 Attempts to Auto-Clear Feed Issues

When a feed error occurs, F200 takes some basic steps to attempt to resolve the feed issue on its own:

- Slowly feed forward to confirm if the error is real or not

- If filament is stuck, attempt to reverse it and re-feed it several times to clear the jam

If these steps are successful, F200 will resume the print without any input from you. If it's unable to clear the jam, it will pause the print and ask for your help.

If F200 encounters more than a certain number of feed errors in a single print (approximately 6), it will stop trying to auto-clear them and will ask for your help.

This auto-resolution process generates extra filament extruded into free air at the front left corner. In some cases this can be dragged into your print - causing print quality issues - so if you see a filament error occur it's a good idea to clear this excess filament out, and monitor the remainder of the print more closely.

The Role of the Filament Monitor

In SOME but not all of these cases, the filament monitor in the extruder may detect the problem and pause the print, (and generate a *filament feed error*). This gives you the opportunity to resolve the situation if you're able, and potentially continue your print. However, **being able to continue the print is not guaranteed**.

Scope of This Document

Due to the complexity and inherently inter-related and multi-layered nature of filament feed problems, the goal of this document is **to educate you on the general approaches and thinking to resolve these issues**. The goal is NOT to cover every possible scenario.

BASIC FIX & TROUBLESHOOTING PROCESS

The basic steps are:

1. Attempt to extrude filament manually
2. Unload filament
3. Cleanup & inspect
4. Re-baseline
5. Re-run print job
6. Watch for issue to happen again

ATTEMPT TO EXTRUDE MANUALLY

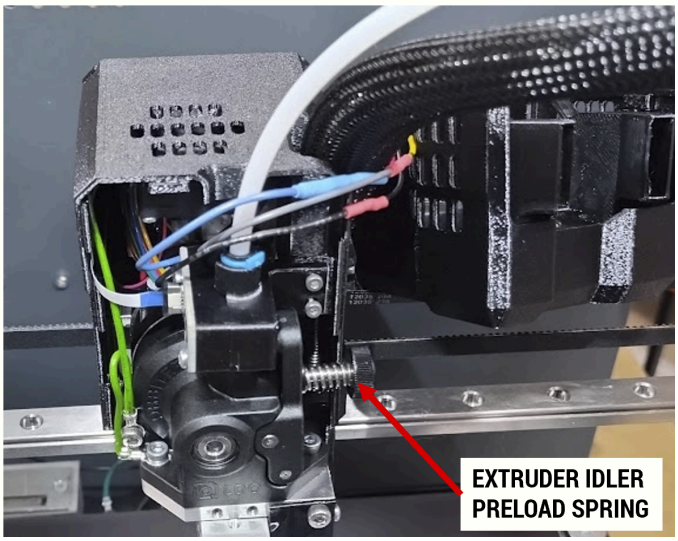
This step helps us confirm if the feed error is real or not.

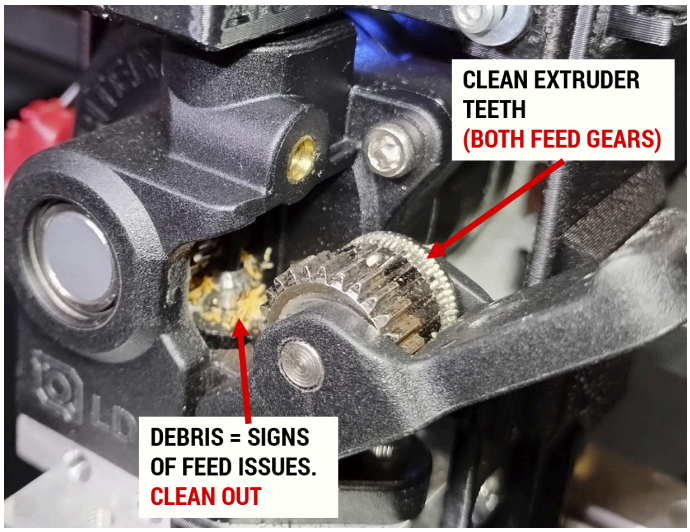
1. Heat the print head back up to operating temperature.

2. Go to the *Control* screen and press and hold the "extrude" button.
3. Monitor the nozzle to see if filament is coming out. If not, push on the filament where it enters the feed tube to give it a little boost. Continue to hold down the "extrude" button while you do this.
4. If you see filament start to come out of the print head, you can try to resume the print and monitor it carefully for additional feed errors. Clean the excess filament off of the print head before you press "resume print".

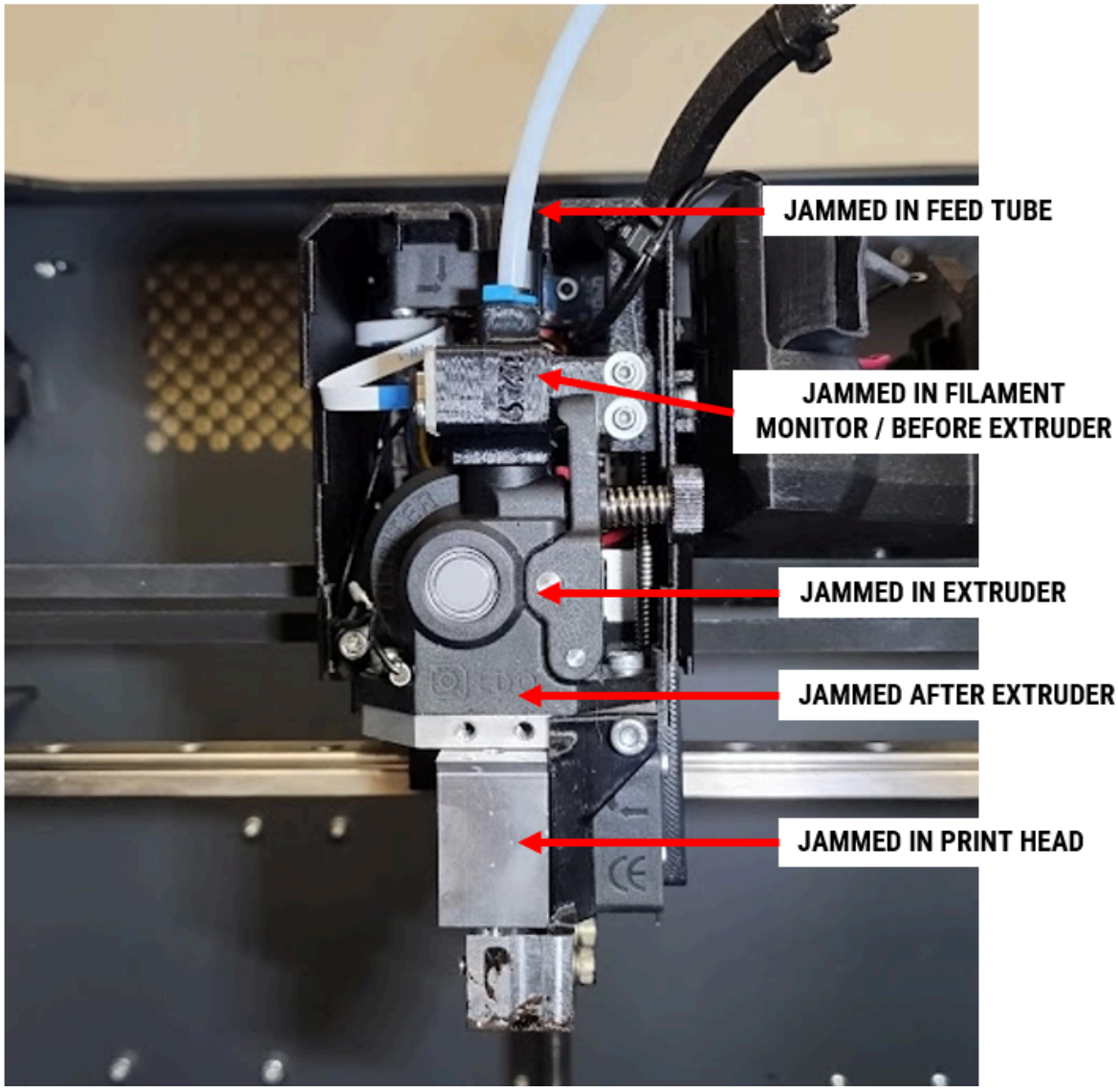
UNLOADING FILAMENT

1. Attempt to unload filament using the "swap filament" button (if in the middle of a print), or "unload filament" if not during a print.
    a. If filament can unload successfully without help, your jam is likely already cleared. Skip to "BASELINE FEED SYSTEM".
    b. Sometimes gently pulling on the filament at the feed tube exit can help it unload.
2. Remove the front housing (CLICK HERE)
3. Open the extruder idler bar and attempt to pull the filament out of the extruder.





4. Determine the location of the filament jam (print head, below extruder, above extruder, above filament monitor)


JAMMED IN FEED TUBE
JAMMED IN FILAMENT MONITOR / BEFORE EXTRUDER
JAMMED IN EXTRUDER
JAMMED AFTER EXTRUDER
JAMMED IN PRINT HEAD

If Jammed in the Print Head

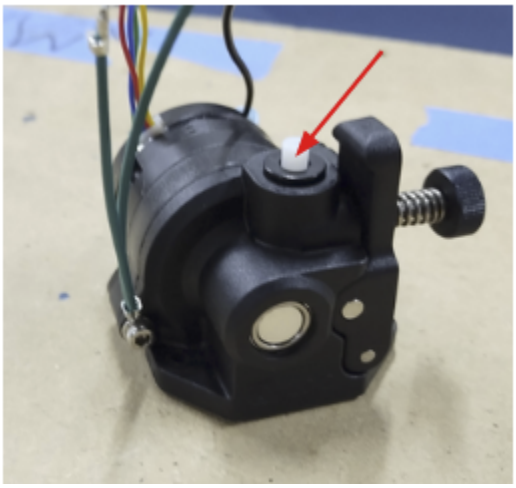
Usually you can feed filament forward to get the head mechanically off of the toolhead, with filament still stuck in it. Then you can cut the filament, and replace the print head tube. Once you cut the filament above the print head you can usually extract the filament back out of the filament path.

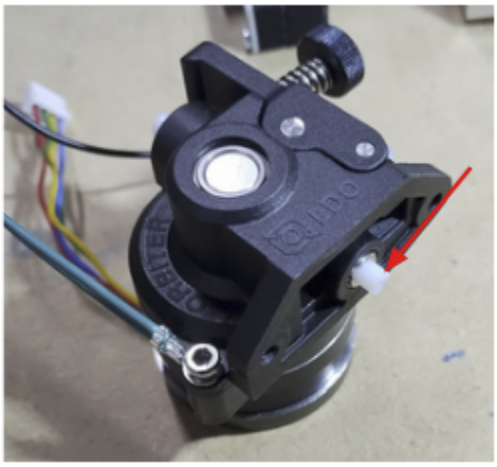
If Jammed in the Extruder Outlet/Inlet

There are 2 short sections of PTFE liner directly below and directly above the extruder.

- Upper liner connects to the bottom of the filament monitor

- Lower liner is inserted into the metal plate below the extruder.





If either of these are missing or out of position or damaged, filament can become stuck.

You may need to remove these liners in order to get filament out of the extruder.

If filament is jammed in the feed section of the extruder, you may need to cut it inside the extruder to extract the upper and lower pieces of filament separately.

These liners can be easily replaced - contact us if you need some.

If Jammed in the Feed Tube / Above the Filament Monitor

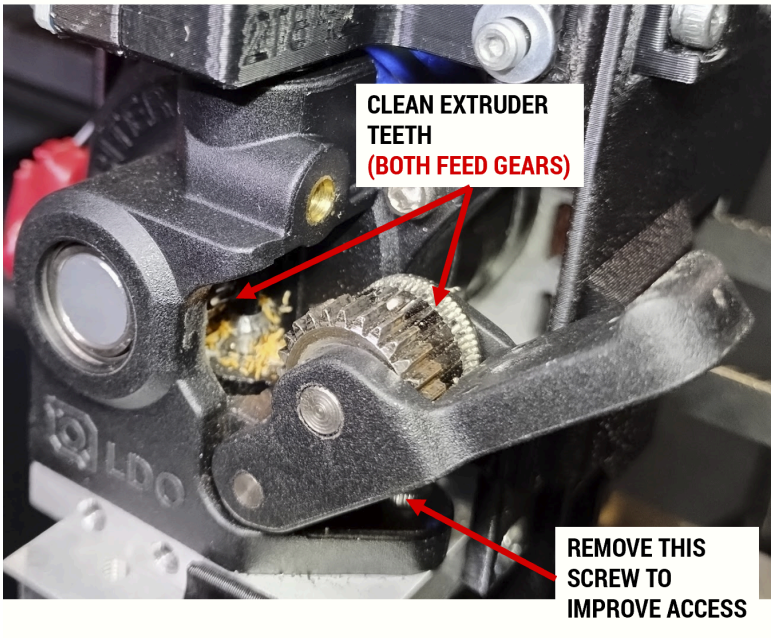
This is almost always caused by a lump or bulge in the filament caused by the manufacturer of the material. Usually accompanied by VERY high force needed to unload the filament. If you see these, this is probably your problem. Continue to use filament at your own risk because these usually indicate a major quality control problem with the roll.

BASELINE FEED SYSTEM

Clean Feed Gear Teeth

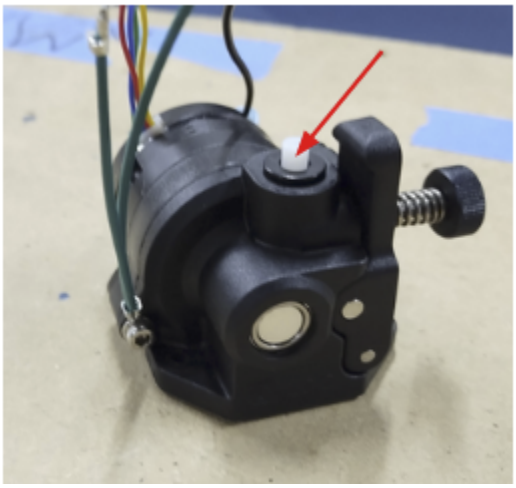
Brush both feed gears out with a soft bristle brush such as a toothbrush. Compressed air can also help.

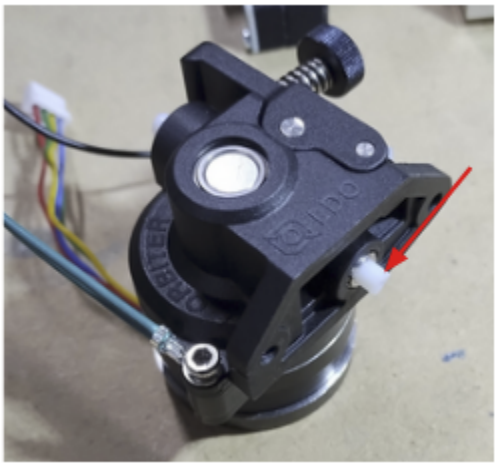
You may need to remove the right extruder mounting screw to open the idler bar fully.



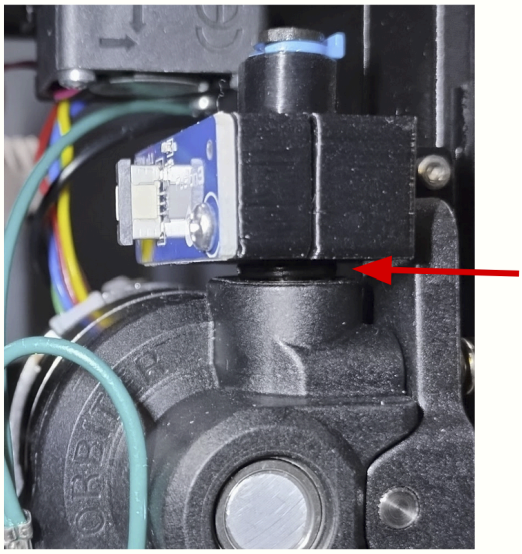
Check Liner Condition and Presence

Confirm that both the upper and lower liners are in place and the filament can pass through them smoothly. Replace if needed.





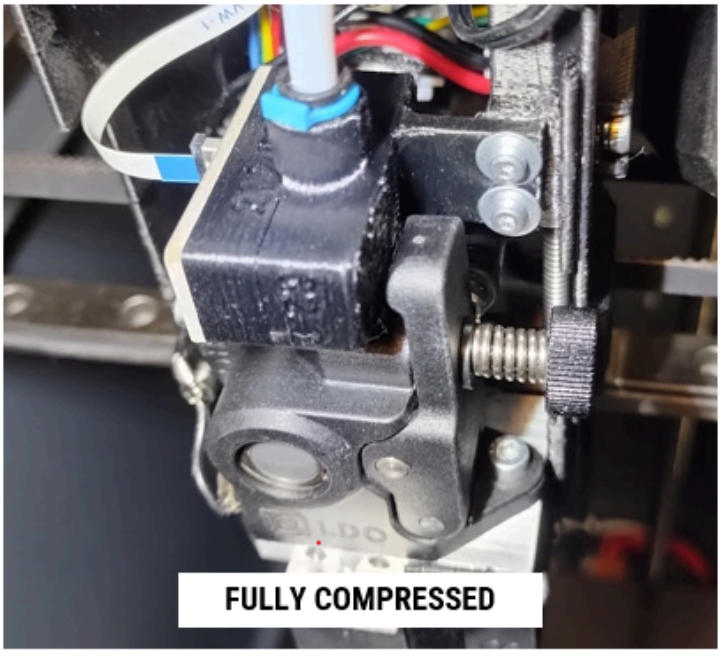
Make sure the filament monitor is seated on the top of the upper liner

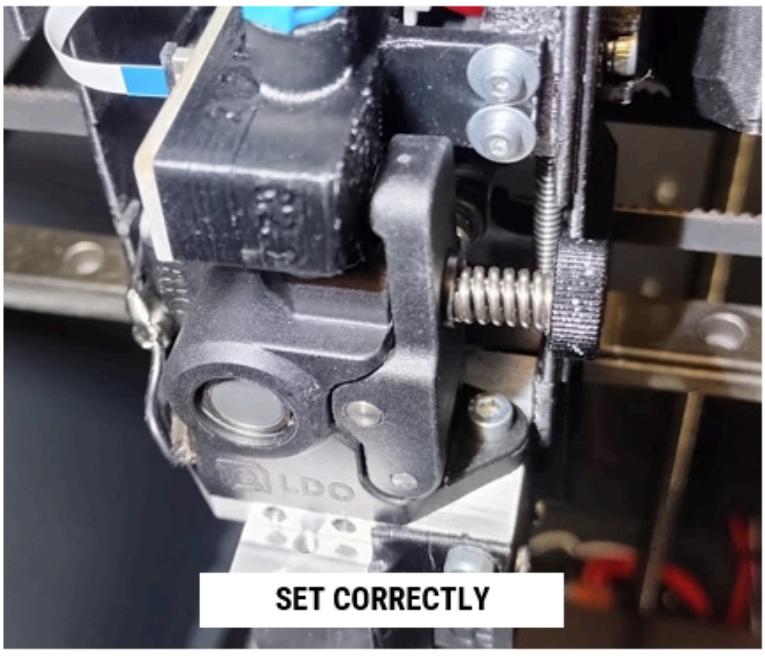


Check Idler Bar Tension

Without filament loaded in the extruder:

1. Close the idler bar and reinstall the tension screw.
2. Fully tighten the tension screw until the spring is fully compressed
3. Reverse the tension screw 2.5 full turns (2x 360 degrees + 180 degrees of rotation)





4. It's acceptable to loosen an additional full turn if needed

Check for Smooth Feeding Through Feed Tube and Filament Monitor

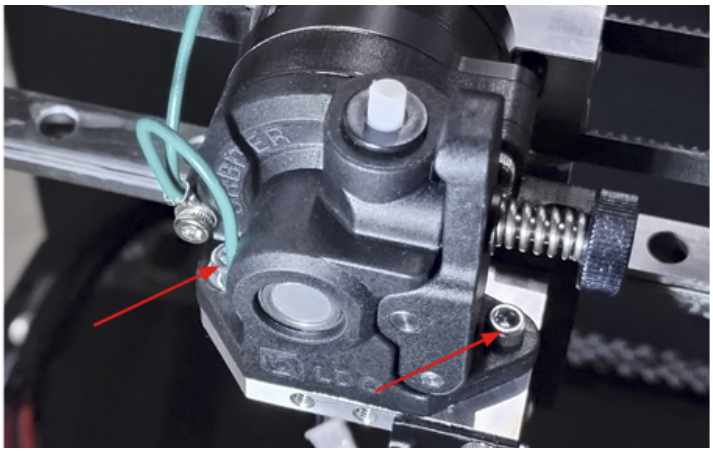
1. Trim the end of your filament at a steep angle

2. Feed it through the main feed tube, as if you're loading filament normally. Monitor for changes in resistance.
3. As the filament enters the filament monitor you should encounter 2 "detents" - increases in resistance. Continue to push and the filament should go an additional 10-20mm into the feed system.

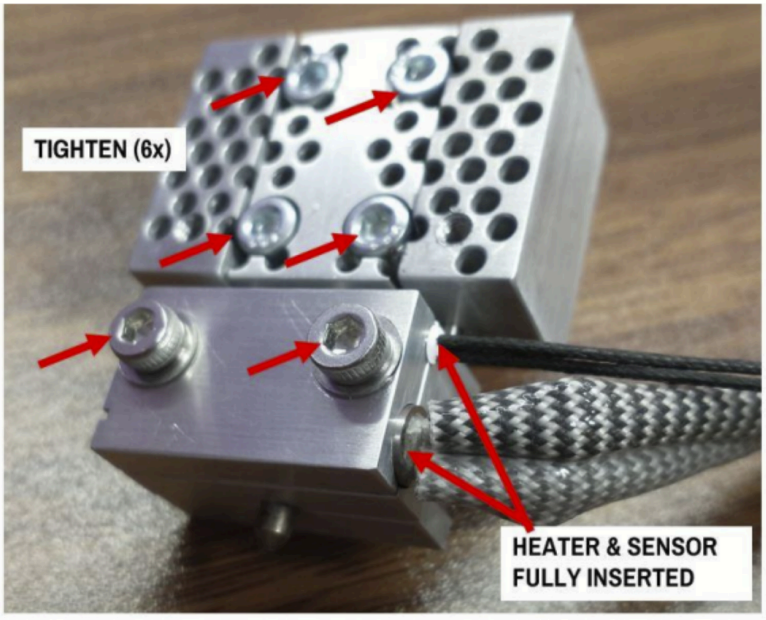
Check Screw Tightness

Check the following screws to make sure they're tight

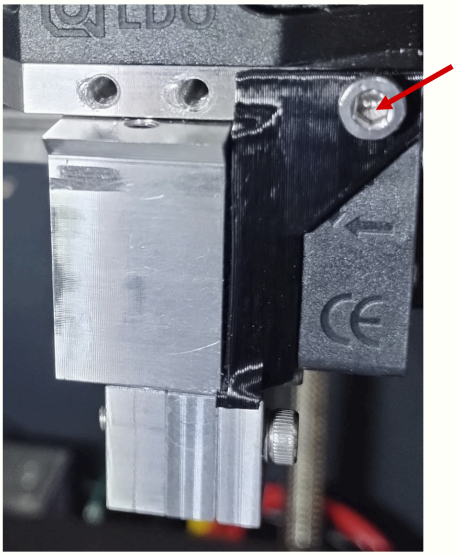
- Extruder:
    - 2x M3 mounting screws

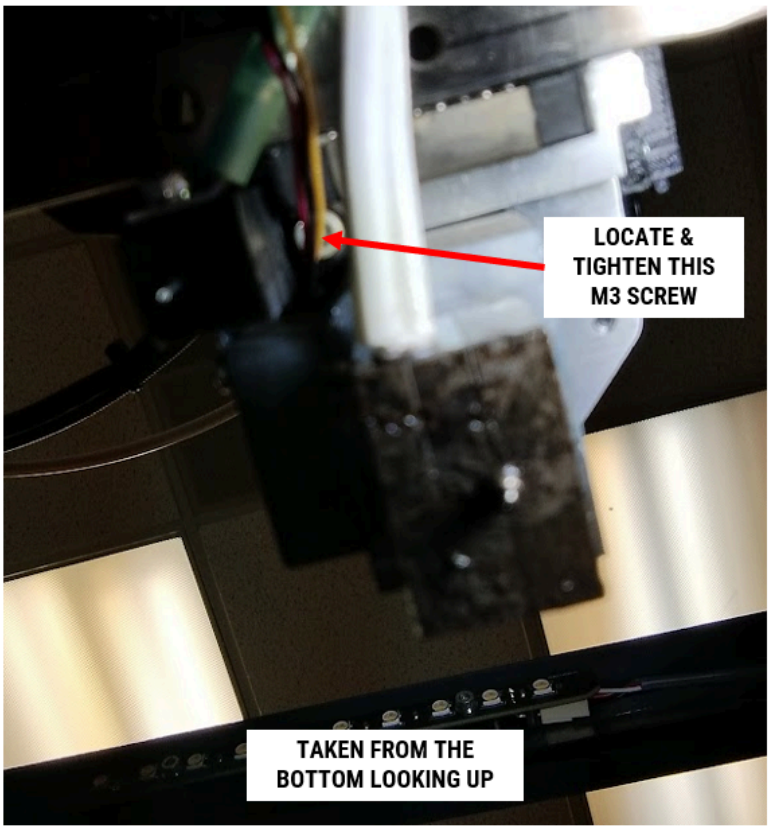


- Print head (will need to remove from toolhead to access):
    - 4x M3 cold side screws
    - 2x M3 hot side screws
    - Heater & sensor fully installed

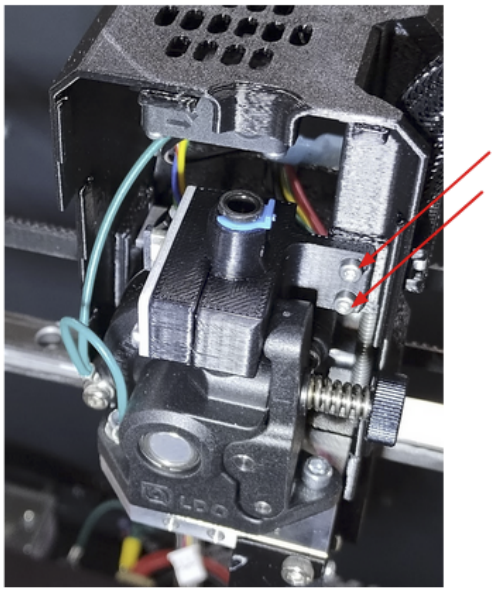


- Cold side fan:
    - 2x M3 screws holding the duct to the plate



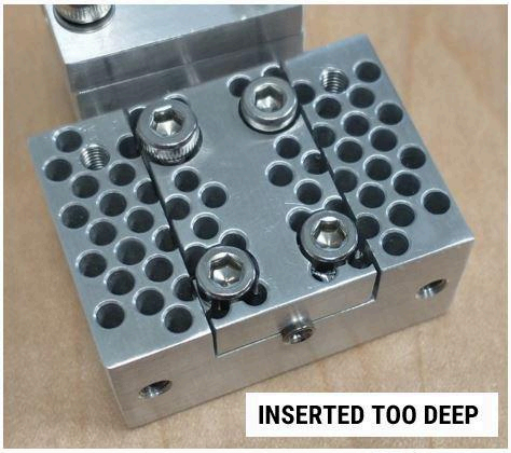


- Filament monitor:
    - 2x M2x6 screws + M3 washer. If your filament monitor does not have washers, or has shorter M2 screws, please replace them with the right hardware.



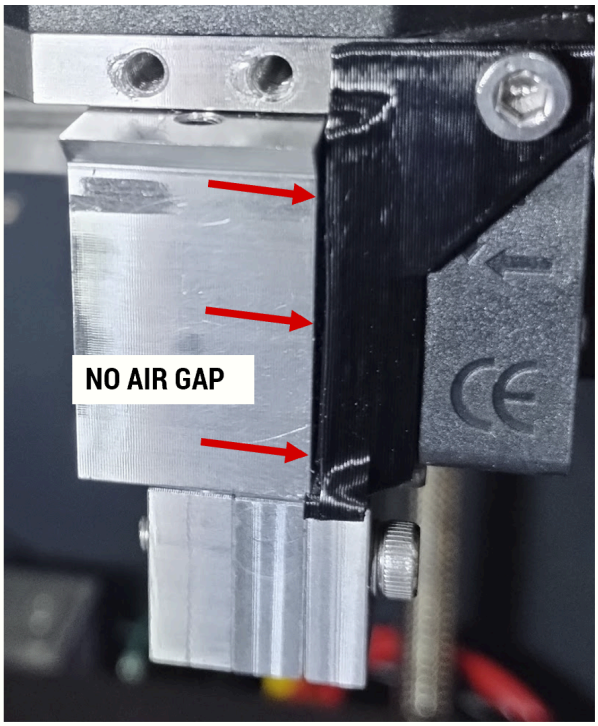
ANVIL Tube Position

On some early/older variants of the ANVIL print head tube with the flared top, it's possible to over-insert the tube into the print head body. This can cause poor heat transfer between the top section of the tube and the heat sink, which effectively lengthens the melt zone and causes very poor performance (stringing, zits, blobs, flow starvation) or jams.



Cold Side Duct Position

Make sure the cooling duct is seated against the ANVIL cold side, to eliminate air leaks.



TROUBLESHOOTING THE FILAMENT MONITOR ITSELF

While rare, it is possible for something to go wrong in the filament monitor that generates what we call "false feed errors" - meaning the filament monitor reports a problem even though filament is being extruded normally.

The common symptom in this situation is back-to-back-to-back filament feed errors that usually auto-resolve on step 1 on their own. A second clue is you see a pile of filament extruded from the print head time, indicating it's not actually jammed.

These issues typically have one of three root causes, from most common to least:

- Filament monitor is out of position (relative to the filament path & extruder).
- Filament monitor wiring (white ribbon cable) is damaged or not properly inserted.
- Filament monitor is internally jammed or damaged (usually by debris).

Filament Monitor Out of Position

If the filament monitor is not positioned correctly, the filament will be side-loaded as it passes through the monitor. This side loading force can cause the encoder wheel to jam and not turn. Both being out of position in the horizontal plane OR out of position rotationally can cause this issue. This is difficult to verify by visual inspection because being out as much as 0.5mm can cause issues.

As our understanding of this sensitivity has evolved we've released 2 updates to the filament monitor design to aid in correct positioning and reduce the odds of this happening; see the first page of the document linked below.

To resolve this issue:

- Follow the steps in THIS DOCUMENT pg 7-10.
- See below for how to test the filament monitor function before reassembling the toolhead.

Filament Monitor Wiring Damaged

The white ribbon cable that connects the filament monitor to the toolboard can develop the following issues:

- Bent or creased too sharply leading to broken traces
- Exposed contacts damaged (typically lifted and folded back)
- Not inserted correctly & fully.

For more information see THIS DOCUMENT

In most cases if you're not sure of the condition of your ribbon cable, we recommend replacing it.

Important - it's possible for the orange LED on the filament monitor to be lit with a damaged cable. Sometimes the damage is intermittent, and sometimes it's on the data lines vs the power lines. Seeing the orange LED lit does not guarantee full functionality.

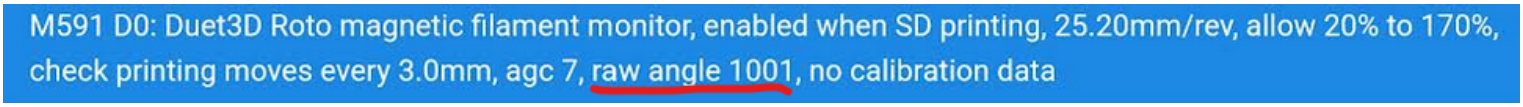
Filament Monitor Internally Jammed or Damaged

This can happen if debris gets into the monitor and clogs the encoder wheel, or if the internal filament path is damaged. Disassembly and reassembly is beyond the scope of this guide, due to how sensitive the alignment of this assembly is. In most cases we recommend replacing the filament monitor if you believe it is internally jammed or damaged.

How to Function Check the Filament Monitor

We have a few tools available to us to directly query the filament monitor and help us determine if the filament monitor is the source of our issue.

Utilities > Console> **Send "M591 D0"**. This will report the filament monitor status including the raw angle of the encoder.


M591 D0: Duet3D Roto magnetic filament monitor, enabled when SD printing, 25.20mm/rev, allow 20% to 170%, check printing moves every 3.0mm, agc 7, raw angle 1001, no calibration data

You can send this command repeatedly and move the filament about 1mm (either by hand or using the "EXTRUDE" button on the *Control* screen) and check that the "raw angle" value changes each time. It will cycle between 0 and approximately 4000. The exact number doesn't matter, you just **don't want to see the same number twice as this indicates the encoder didn't move**.

NOTE: If you get an error message that says something like "filament monitor not found" or similar, this means your printer cannot find the filament monitor electronically. This usually indicates a problem with the ribbon cable.

[your printer's IP address]/files/macros/fusion3/ **run "loadfil_verbose"**. This is a variation on our normal load filament macro that will output the encoder's position to the console at a few points in the loading filament process (you can see in this screenshot that our filament monitor is reporting zero movement - this is a problem).

Alternately, you can send this command on the console: **M98 P"0:/macros/fusion3/loadfil_verbose"**

2025-03-18T14:45:35 grab check: 278, 279, 279
2025-03-18T14:45:35 echo {"grab check: " ^ var.filpos1 ^ ", " ^ var.filpos2 ^ ", " ^ var.filpos3}: grab check: 278, 279, 279
025-03-18T14:45:28 grab check: 278, 278, 279
2025-03-18T14:45:28 echo {"grab check: " ^ var.filpos1 ^ ", " ^ var.filpos2 ^ ", " ^ var.filpos3}: grab check: 278, 278, 279
2025-03-18T14:45:21 grab check: 270, 278, 278
2025-03-18T14:45:21 echo {"grab check: " ^ var.filpos1 ^ ", " ^ var.filpos2 ^ ", " ^ var.filpos3}: grab check: 270, 278, 278

If you're not sure if your filament monitor is bad, or if it's a mounting alignment issue, do this:

1. Leave filament loaded into the printer, if it's loaded. Your printer should be powered on.
2. Remove the 2 screws that bolt the filament monitor onto the toolhead housing. LEAVE the ribbon cable connected and be careful not to pull on it.
3. If you don't have filament loaded, insert a piece through the filament monitor.

4. Run M591 D0 several times as you slide the filament through the monitor, or slide the monitor up and down the filament. If you see values that change, your filament monitor is fine and you have a mounting problem.

MISCELLANEOUS CASES / OTHER THINGS TO CHECK

Filter Fan

The recirculating filter fan on F200 has closed-loop control. So if the fan stops spinning, or spins too slowly or too quickly, the printer will detect this and tell you. However, if the fan comes out of position in the filter housing, this can cause limited air recirculation and can cause elevated temperatures in the top of the chamber.

To check the filter fan, remove the filter housing as if you're replacing the filter elements and visually inspect the fan.